19.0 PHYSICAL EXAMINATION AND CLASSIFICATION OF TOOLS AND TOOLMARK METHODS

19.1 Scope: This method is used for the initial examination and classification of tools and toolmarks. Tools can be of various types and classes (E.g., prying type, gripping type, opposed blade cutting, bypass cutting, flat blade, etc.). Toolmarks can be of two types, impressed or striated.

A tool is defined by AFTE as an object used to gain mechanical advantage. Tools are also thought of as the harder of two objects which, when brought in to contact with each other, results in the softer one being marked by the harder one.

Impressed toolmarks are those marks produced when a tool is place against an object and enough pressure us applied to the tool that it leaves an impression in the object.

Striated toolmarks are those produced when a tool is placed against an object softer than the tool and, with pressure applied, the tool is moved across the object, producing a scrape. The parallel surface irregularities produced by this scraping action are known as striations.

19.2 Precautions/Limitations: The firearm examiner shall exercise care in examining tools and toolmarks, recognizing that trace evidence may be present. If noted, the trace evidence shall be collected by the firearm examiner or by a representative from the Microanalysis Unit.

19.3 Related Information:

19.3.1 Microscopic Comparison Methods 16
19.3.3 Toolmark Test Standards and Casting Methods 20
19.3.4 Worksheet Appendix 1
19.3.5 Range of Conclusions Appendix 4
19.3.6 Performance Checks and Maintenance Appendix 7

19.4 Instruments:

19.4.1 Stereomicroscope
19.4.2 Calipers
19.4.3 Ruler

19.5 Reagents/Materials: None

19.6 Hazards/Safety:

19.6.1 It is the responsibility of the firearm examiner to employ appropriate safety and health practices.

19.7 Reference Materials/Controls/Calibration Checks:

19.7.1 All controls and calibration checks shall be performed in strict accordance to those listed in the Performance Checks and Maintenance Appendix 7.

19.8 Procedures/Instructions:

19.8.1 Document the condition of the evidence packaging as received.

19.8.2 Mark the outside of the original packaging with the case number, exhibit number and examiners initials.

19.8.3 Describe the tool as received. A worksheet may be filled out and include the following:

- Trace evidence (paint, etc) present on the tool.
- The class characteristics of the tool.
- The type of tool.
- The brand name of tool.
- The size of the tool.
- The condition of the tool, and any damage present.
- Any areas that appear to have been used recently.
- Type of tests conducted (if any).
- The methods used to produce test toolmarks, and the medium used.
- Any other data deemed relevant by the examiner.

19.8.4 Describe the evidence to be examined for toolmarks, and the type of toolmarks present. Notes may include:

- Location of the toolmarks.
- Type of toolmark
  - Impressed
  - Striated
- Class of tool that made the toolmark(s).
  - Cutting type (pinching, bypass, shear, etc.)
  - Prying type (flat blade, etc.)
  - Gripping type (serrated jaws, etc.)
- Physical characteristics of the toolmark(s).
- Direction of the toolmark.
- The suitability of the toolmark for comparison purposes.
- Any other data deemed relevant by the examiner.

19.9 Records: The firearm examiner shall document their findings in the form of handwritten notes, computer generated notes, photography, or by utilizing a toolmark worksheet.

19.10 Interpretations of Results: None.

19.11. Report Writing: Most toolmark report writing can be found in the Range of Conclusions Appendix 4.

19.12. References:

Association of Firearms and Toolmark Examiners Glossary, 5th Edition, 2007.

Association of Firearms and Toolmark Examiners Training Manual, March 3, 2001.

Association of Firearms and Toolmark Examiners Procedures Manual, July 9, 2001.

Cochrane, D.W., "Class Characteristics of Cutting Tools and Surface Design", AFTE Journal, July 1985, Vol. 17, No.3, pgs. 73-82.

Miller, Jerry, "An Introduction to the Forensic Examination of Toolmarks", AFTE Journal, Summer 2001, Vol. 33, No.3, pgs. 233-248.